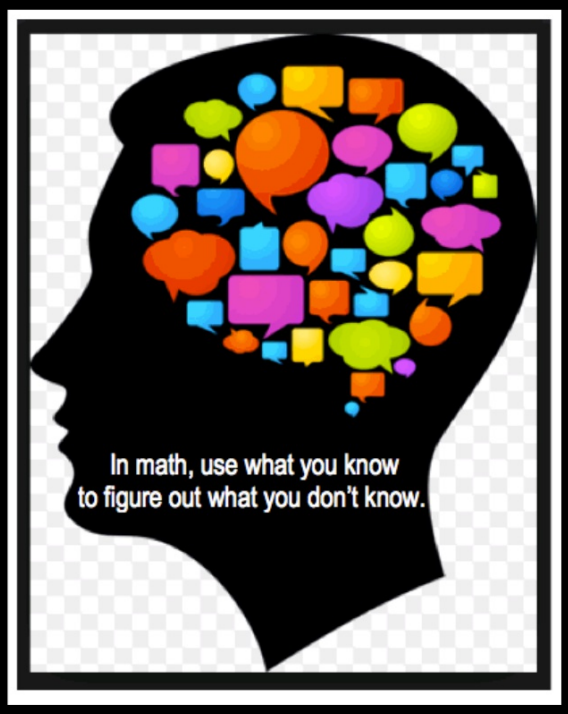



$y = x^2$

$y = -x^2$

$y = -x^2+3$ UP 3

$y = x^2-4$ ↓ 4

$y = (x-2)^2$ → 2

$y = (x+3)^2$ ← 3

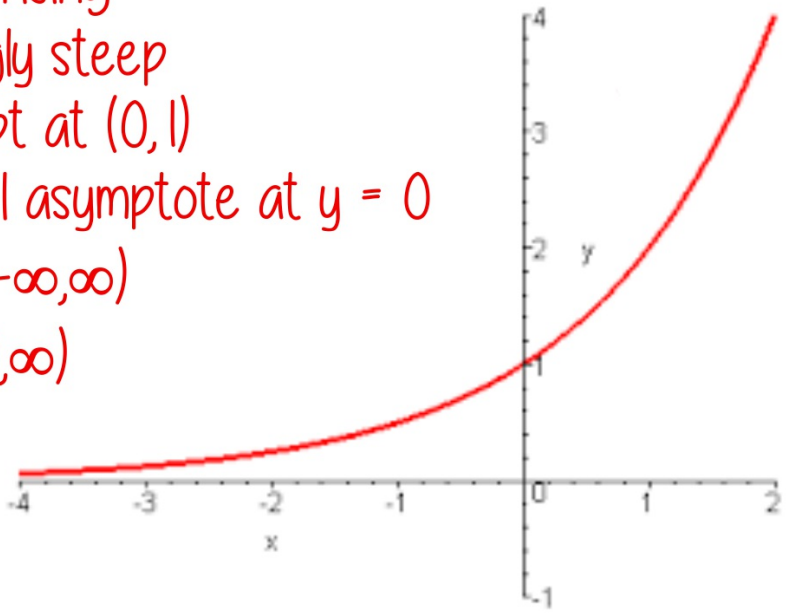
**Use what you already know (generalize) about parent functions and their transformations to apply to these new graphs.**

# Sec 4.1 Exponential Functions
# ~Graphing~

**We will graph and also list the domain, range and HA…with modifications.**

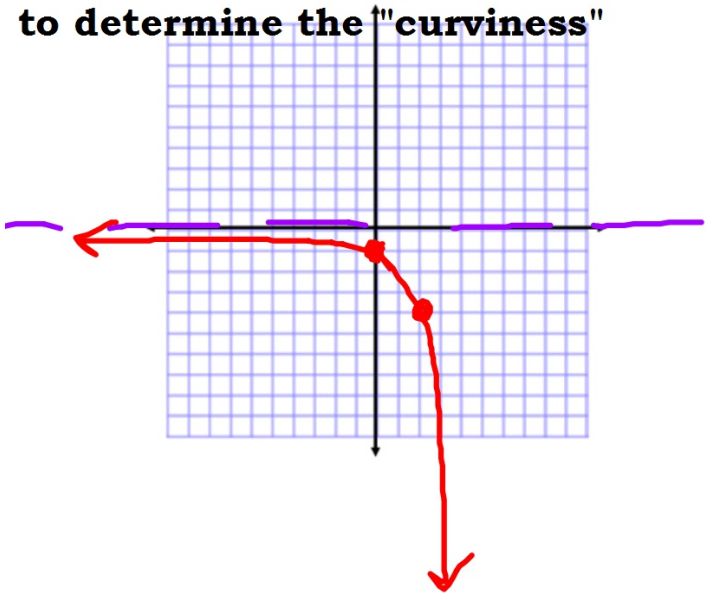
Basic shape of an exponential graph-
flat, then rising
increasingly steep
y-intercept at (0, 1)
horiziontal asymptote at y = 0
domain- (-∞,∞)
range- (0,∞)

$y = 2^x$



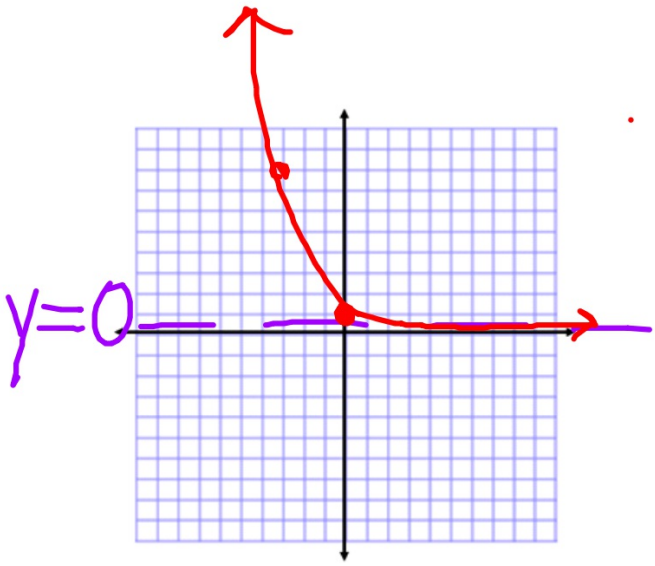
$y = -2^x$

**-Graph the horiziontal asymptote, with the equation.**
**-Plot the y-intercept (either by flipping the original upside-down, or letting x =0 and evaluating)**
**-Obtain one other point in QIV to determine the "curviness"**

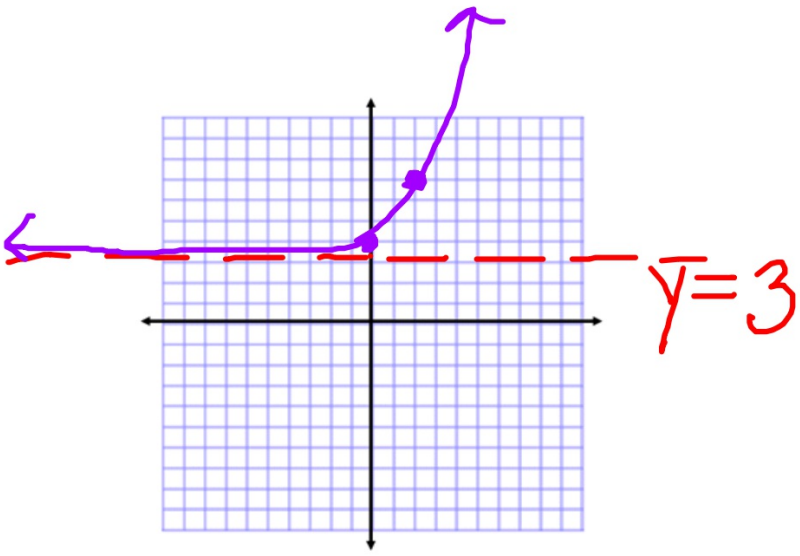


$y = 2^{-x}$

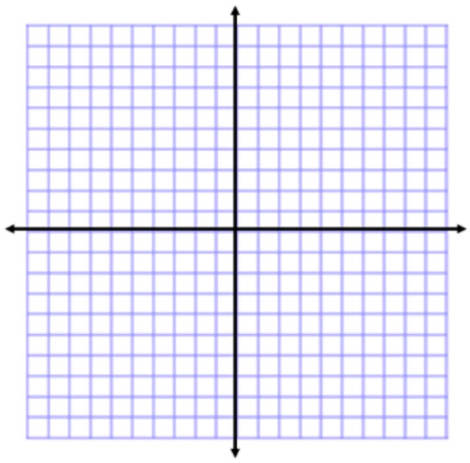
**flips over the y-axis**



$y = 2^x + 3$



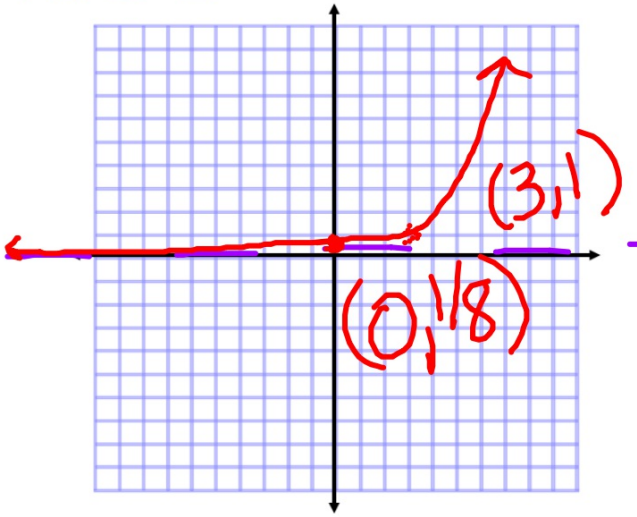

$y = 2^x - 4$



$y = 2^{x-3}$ → 3

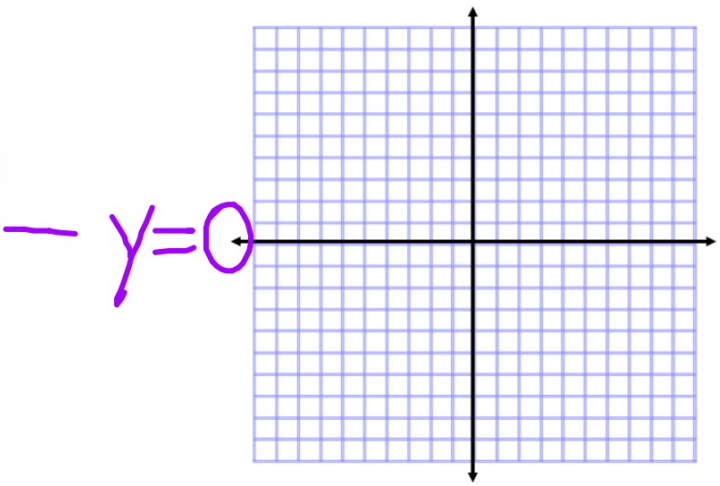
d: $\mathbb{R}$ r: $(0, \infty)$

y-intercept translated to -->




$y = 2^{x+1}$

y-intercept translated to -->




**The graph didn't move up or down, so the asymptote is still at y = 0.**
**It moved right 3, so the y-intercept changed.**

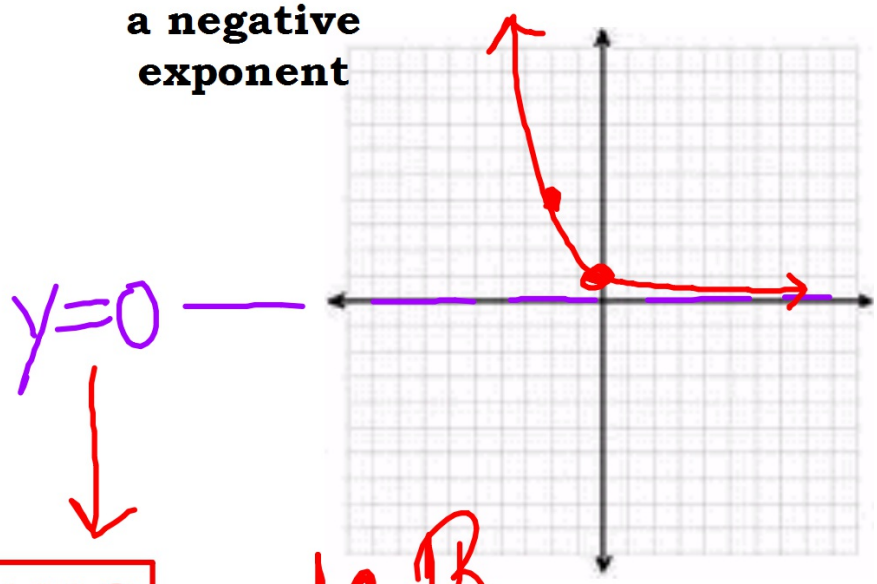
**Graph using a table-**

$y = \left(\frac{1}{2}\right)^x$

| x | y |
|---|---|
| 0 | 1 |
| -2 | 4 |

domain? range? HA?

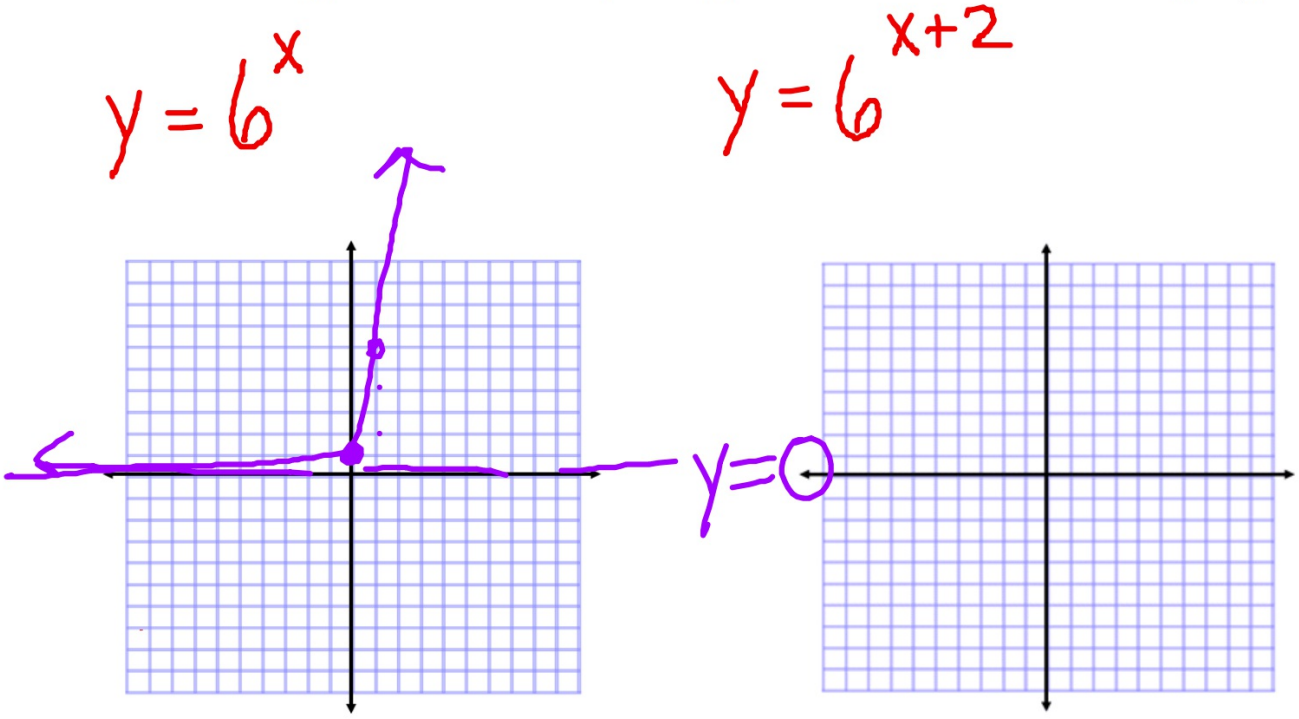
**btw- a fractional base corresponds to a negative exponent**




d: $\mathbb{R}$

r: $(0, \infty)$

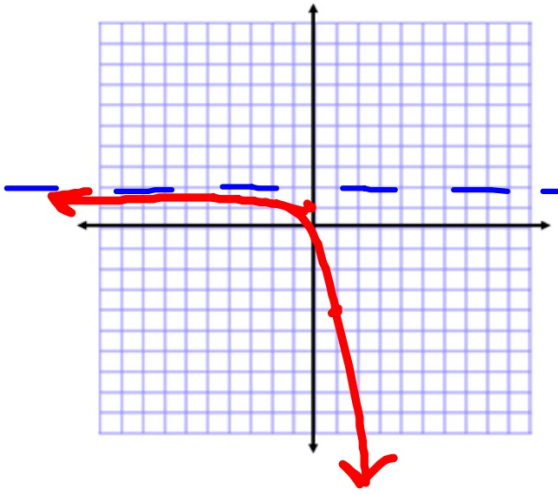
**Sketch...listing the domain, range and horizontal asymptote**




**d: all real numbers**
**r: (0,infinity)**
**horizontal asymptote at y = 0**

Sketch- include the y-intercept, one other point and the HA.

$y = -6^x + 2$



✓flipped

✓moved up 2

y-int @ (0,1)

$y = 2$ ← HA

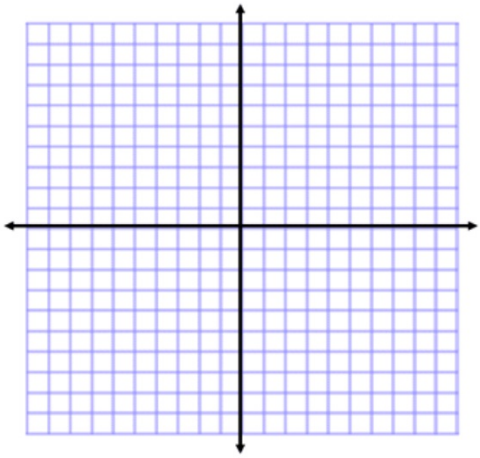
Let $x = 0$

d: $(-\infty, \infty)$

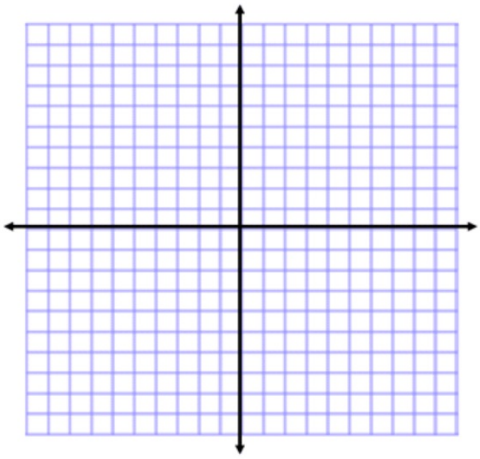
r: $(-\infty, 2)$

domain? range? HA? y-intercept?

$y = 6^{-x} - 3$



$y = -6^{-x}$




**Sec 4.1, page 451**
**1,3,7,**
**11,13 (detailed sketch),**
**19-24**
**25-33 (odds, rough sketch)**

**ILT days-**
**I sent you home with graph paper, but if you need more, you can find free graph paper online and print.**
**Also, for the solutions I described the graphs but if you would like to take a photo and send me the image, I am glad to look at it and ensure it's correct and complete.**

1. 10.556
3. 11.665
7. 9.974

11. should be rising, left to right and contain the points (-1, 1/4), (0,1) and (1,4)

13. should be rising, left to right and containt the points (-1, 2/3), (0,1), (1,3/2)

19. $H(x) = -3^{-x}$

20. $g(x) = 3^{x-1}$

21. $F(x) = -3^{x}$

22. $f(x) = 3^{x}$

23. $h(x) = 3^{x} - 1$

24. $G(x) = 3^{-x}$

25. rising, shifted left 1
contains (-1,1), (0,2)
asymptote at y = 0
domain- all reals
range (0,∞)

27. rising, shifted down 1
contains (0,0), (1,1)
asymptote at y = -1
domain- all reals
range (-1,∞)

*using table function on graphing calculator
*can see graphs in my teacher's edition text

29. rising, shifted left 1, down 1
contains (-1,0), (0,1)
asymptote at y = -1
domain- all reals
range- (-1,∞)

31. falling, flipped over the x-axis
contains (0,-1) and (1,-2)
asymptote at y = 0
domain- all reals
range (-∞, 0)

33. rising, steeper
contains (-1,1) and (0,2)
asymptote at y = 0
domain- all reals
range- (0,∞)